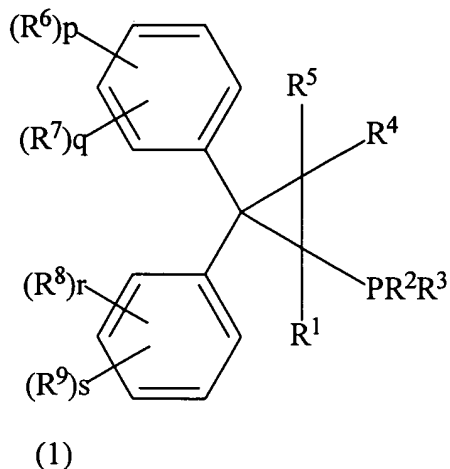


## AMENDMENTS TO THE CLAIMS

**1. (Original)** A phosphine compound of formula (1),

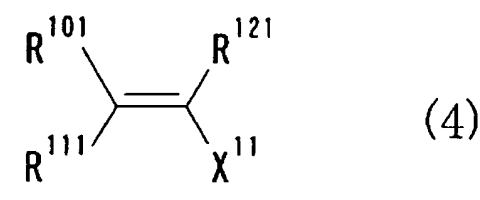
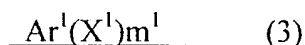


wherein  $R^1$  is a hydrogen atom, an alkyl group, a cycloalkyl group or a phenyl group which may be substituted;  $R^2$  and  $R^3$  are each, the same or different, an alkyl group, a cycloalkyl group or a phenyl group which may be substituted;  $R^4$  and  $R^5$  are each, the same or different, a hydrogen atom, an alkyl group, a cycloalkyl group or a phenyl group which may be substituted;  $R^6$ ,  $R^7$ ,  $R^8$  and  $R^9$  are each, the same or different, an alkyl group, a cycloalkyl group, a phenyl group which may be substituted, an alkoxyl group, a dialkylamino group, a halogen atom, a benzyl group, a naphthyl group or a halogenated alkyl group;  $R^6$  and  $R^7$ , or  $R^8$  and  $R^9$  each may be combined to form, a fused ring, a trimethylene group, a tetramethylene group or a methylenedioxy group;  $p$ ,  $q$ ,  $r$  and  $s$  are each an integer of from 0 to 5; and  $p + q$ , and  $r + s$  are each in the range of from 0 to 5.

**2. (Original)** A palladium-phosphine complex which can be obtained by reacting the phosphine compound of claim 1 with a palladium compound.

**3. (Original)** The palladium-phosphine complex of claim 2, wherein the palladium compound is a palladium salt or a palladium complex in which the valency of palladium is 4, 2 or 0.

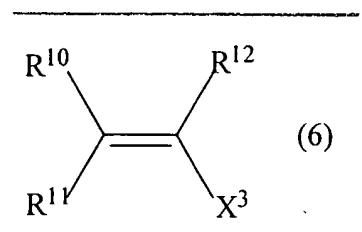
**4. (Currently amended)** A method of manufacturing method of an unsaturated compound or an aromatic compound which comprises reacting a compound of formula (3) or (4) below:



wherein, in formula (3), Ar<sup>1</sup> is an aryl group which may be substituted or a heteroaryl group which may be substituted; X<sup>1</sup> is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and m<sup>1</sup> is an integer of 1 to 4, and,

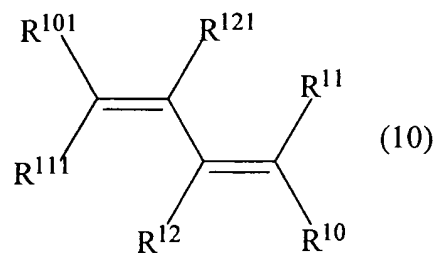
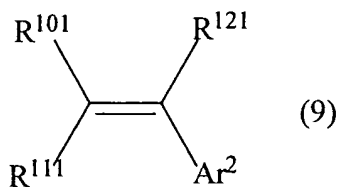
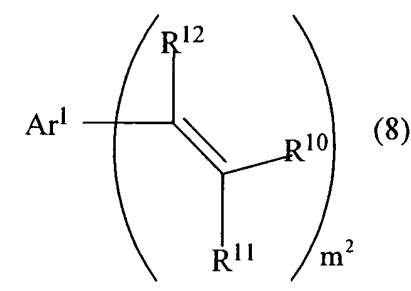
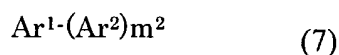
in formula (4), R<sup>101</sup>, R<sup>111</sup> and R<sup>121</sup> are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group; X<sup>11</sup> is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group,

with a compound, of formula (5) or (6) below,



wherein, in formula (5), Ar<sup>2</sup> is an aryl group which may be substituted or a heteroaryl group which may be substituted; X<sup>2</sup> is B(OR<sup>13</sup>)(OR<sup>14</sup>), Sn(R<sup>15</sup>)<sub>3</sub>, MgX, ZnX, Al(R<sup>15</sup>)<sub>2</sub> or Li, and,

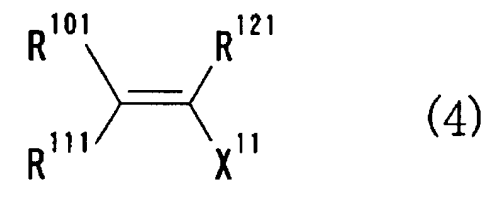
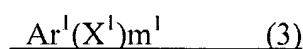
in formula (6),  $R^{10}$ ,  $R^{11}$  and  $R^{12}$  are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group;  $R^{10}$  and  $R^{12}$  may be combined to form a single bond, forming together with the existing double bond a triple bond;  $X^3$  is a hydrogen atom,  $B(OR^{13})(OR^{14})$ ,  $Sn(R^{15})_3$ ,  $MgX$ ,  $ZnX$ ,  $Al(R^{15})_2$  or  $Li$ ;  $R^{13}$  and  $R^{14}$  are each, the same or different, a hydrogen atom, an alkyl group, or, combined to form an ethylene group or a 1,2-dimethylethylene group;  $R^{15}$  is an alkyl group, and  $X$  is a chlorine atom, a bromine atom or an iodine atom, to give a compound of formula (7), (8), (9) or (10),



wherein  $\text{Ar}^1$ ,  $\text{Ar}^2$ ,  $\text{R}^{10}$ ,  $\text{R}^{11}$ ,  $\text{R}^{12}$ ,  $\text{R}^{101}$ ,  $\text{R}^{111}$  and  $\text{R}^{121}$  are as defined above and  $m^2$  is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the ~~by the use of palladium-phosphine complexes~~ complex of mentioned in claim 2 as a catalyst.

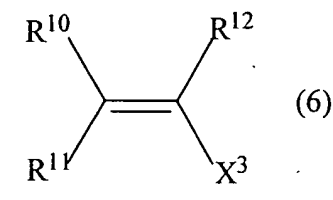
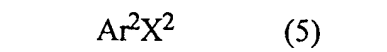
**5. (Currently amended)** A method of manufacturing method of an unsaturated compound or an aromatic compound which comprises reacting a compound of formula (3) or (4) below:



wherein, in formula (3),  $\text{Ar}^1$  is an aryl group which may be substituted or a heteroaryl group which may be substituted;  $\text{X}^1$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and  $m^1$  is an integer of 1 to 4, and,

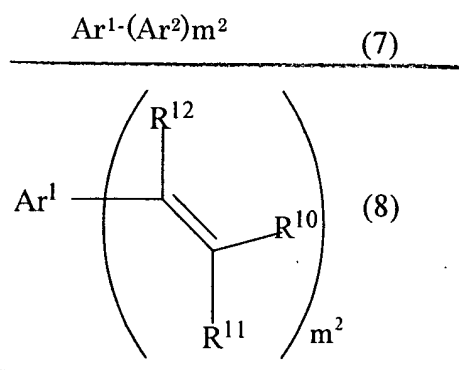
in formula (4),  $\text{R}^{101}$ ,  $\text{R}^{111}$  and  $\text{R}^{121}$  are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxycarbonyl group or a cyano group;  $\text{X}^{11}$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group.

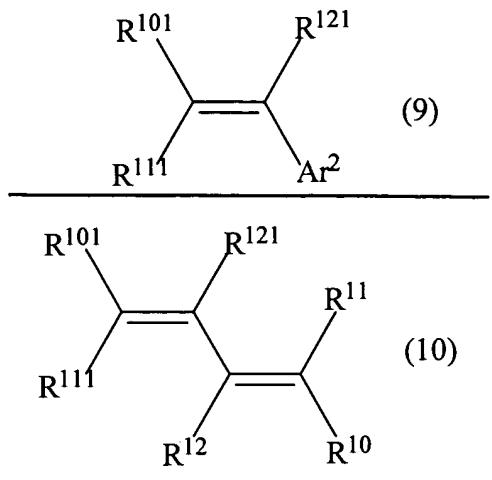
with a compound, of formula (5) or (6) below,



wherein, in formula (5),  $\text{Ar}^2$  is an aryl group which may be substituted or a heteroaryl group which may be substituted;  $\text{X}^2$  is  $\text{B}(\text{OR}^{13})(\text{OR}^{14})$ ,  $\text{Sn}(\text{R}^{15})_3$ ,  $\text{MgX}$ ,  $\text{ZnX}$ ,  $\text{Al}(\text{R}^{15})_2$  or  $\text{Li}$ , and,

in formula (6),  $\text{R}^{10}$ ,  $\text{R}^{11}$  and  $\text{R}^{12}$  are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group;  $\text{R}^{10}$  and  $\text{R}^{12}$  may be combined to form a single bond, forming together with the existing double bond a triple bond;  $\text{X}^3$  is a hydrogen atom,  $\text{B}(\text{OR}^{13})(\text{OR}^{14})$ ,  $\text{Sn}(\text{R}^{15})_3$ ,  $\text{MgX}$ ,  $\text{ZnX}$ ,  $\text{Al}(\text{R}^{15})_2$  or  $\text{Li}$ ;  $\text{R}^{13}$  and  $\text{R}^{14}$  are each, the same or different, a hydrogen atom, an alkyl group, or, combined to form an ethylene group or a 1,2-dimethylethylene group;  $\text{R}^{15}$  is an alkyl group, and  $\text{X}$  is a chlorine atom, a bromine atom or an iodine atom, to give a compound of formula (7), (8), (9) or (10),



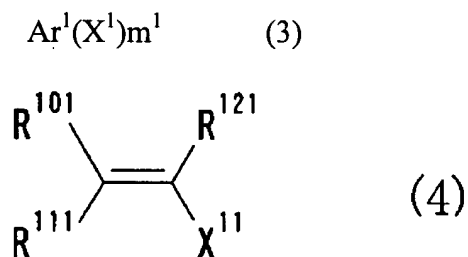


wherein  $\text{Ar}^1$ ,  $\text{Ar}^2$ ,  $\text{R}^{10}$ ,  $\text{R}^{11}$ ,  $\text{R}^{12}$ ,  $\text{R}^{101}$ ,  $\text{R}^{111}$  and  $\text{R}^{121}$  are as defined above and  $m^2$  is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of ~~by the use of~~ the phosphine compound mentioned in claim 1 and a palladium compound as catalysts.

## 6. (Cancelled)

**7. (Currently amended)** A method of manufacturing an unsaturated compound or an aromatic compound ~~method of claim 4;~~ which comprises reacting a compound of formula (3) or (4) below,



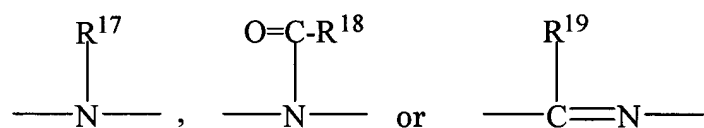
wherein, in formula (3),  $\text{Ar}^1$  is an aryl group which may be substituted or a heteroaryl group which may be substituted;  $\text{X}^1$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and  $m^1$  is an integer of from 1 to 4, and,

in formula (4),  $R^{101}$ ,  $R^{111}$  and  $R^{121}$  are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxy carbonyl group or a cyano group;  $X^{11}$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group,

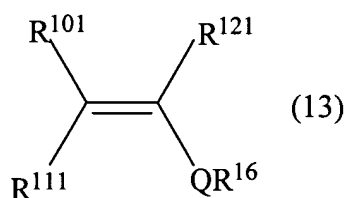
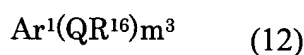
with an oxygen compound or a nitrogen compound of formula (11) below,



wherein  $R^{16}$  is an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; Q is an oxygen atom,



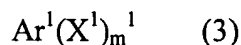
wherein  $R^{17}$ ,  $R^{18}$  and  $R^{19}$  are each a hydrogen atom, an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; and  $R^{16}$  and  $R^{17}$  may be combined to form a divalent aromatic ring which may be substituted, to give a compound of formula (12) or (13) below,



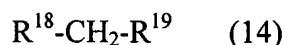
wherein  $Ar^1$ , Q,  $R^{16}$ ,  $R^{101}$ ,  $R^{111}$  and  $R^{121}$  are as defined above and  $m^3$  is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the palladium-phosphine complex of claim 2 as a catalyst.

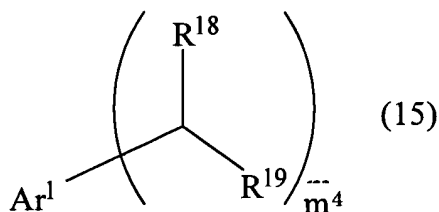
**8. (Currently amended)** ~~The~~ A method of manufacturing an unsaturated compound or an aromatic compound ~~method of claim 4,~~ which comprises reacting an aromatic compound of formula (3),



wherein  $\text{Ar}^1$  is an aryl group which may be substituted or a heteroaryl group which may be substituted;  $\text{X}^1$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group, and  $m^1$  is an integer of from 1 to 4, with a carbonyl compound or a cyano compound of formula (14),



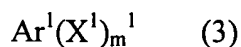
wherein  $\text{R}^{18}$  is a hydrogen atom,  $\text{CO}_2\text{R}^{20}$ ,  $\text{C(=O)R}^{21}$  or a cyano group;  $\text{R}^{19}$  is  $\text{CO}_2\text{R}^{22}$ ,  $\text{C(=O)R}^{23}$  or a cyano group;  $\text{R}^{20}$ ,  $\text{R}^{21}$ ,  $\text{R}^{22}$  and  $\text{R}^{23}$  are each an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted, to give a compound of formula (15),



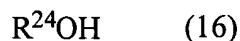
wherein  $\text{Ar}^1$ ,  $\text{R}^{18}$  and  $\text{R}^{19}$  are as defined above and  $m^4$  is an integer of 1 to 4, and wherein the reaction is conducted in the presence of the palladium-phosphine complex of claim 2 as a catalyst.

**9. (Currently amended)** ~~The~~ A method of manufacturing an unsaturated compound or an aromatic compound ~~method of claim 4,~~ which comprises reacting an aromatic compound of formula (3),

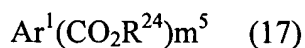




wherein  $\text{Ar}^1$  is an aryl group which may be substituted or a heteroaryl group which may be substituted;  $\text{X}^1$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group; and  $m^1$  is an integer of from 1 to 4, with carbon monoxide and an alcohol of formula (16),



wherein  $\text{R}^{24}$  is an alkyl group,  
to give a carboxylic ester of formula (17),

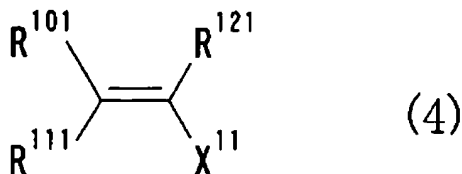
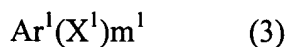


wherein  $\text{Ar}^1$  and  $\text{R}^{24}$  are as defined above and  $m^5$  is an integer of 1 to 4, and  
wherein the reaction is conducted in the presence of the palladium-phosphine  
complex of claim 2 as a catalyst.

**10. (Currently amended)** The method of manufacturing an ~~method of~~ unsaturated compounds~~compound~~, as ~~elaimed~~ in claim 4, which comprises carrying out the reaction in the presence of a base.

**11. (Cancelled)**

**12. (New)** A method of manufacturing an unsaturated compound or an aromatic compound which comprises reacting a compound of formula (3) or (4) below,



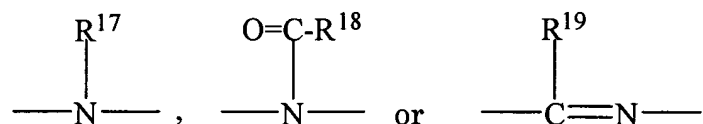
wherein, in formula (3), Ar<sup>1</sup> is an aryl group which may be substituted or a heteroaryl group which may be substituted; X<sup>1</sup> is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group and m<sup>1</sup> is an integer of from 1 to 4, and,

in formula (4), R<sup>101</sup>, R<sup>111</sup> and R<sup>121</sup> are each, the same or different, a hydrogen atom, an alkyl group, an aryl group which may be substituted, a heteroaryl group which may be substituted, an alkoxycarbonyl group or a cyano group; X<sup>11</sup> is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group,

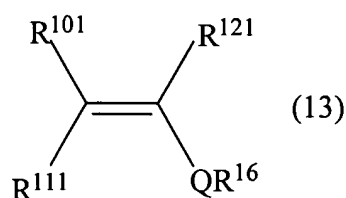
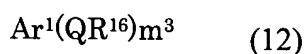
with an oxygen compound or a nitrogen compound of formula (11) below,



wherein R<sup>16</sup> is an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; Q is an oxygen atom,



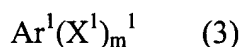
wherein R<sup>17</sup>, R<sup>18</sup> and R<sup>19</sup> are each a hydrogen atom, an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted; and R<sup>16</sup> and R<sup>17</sup> may be combined to form a divalent aromatic ring which may be substituted, to give a compound of formula (12) or (13) below,



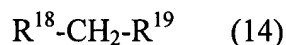
wherein  $\text{Ar}^1$ ,  $\text{Q}$ ,  $\text{R}^{16}$ ,  $\text{R}^{101}$ ,  $\text{R}^{111}$  and  $\text{R}^{121}$  are as defined above and  $m^3$  is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the phosphine compound of claim 1 and a palladium compound as catalysts.

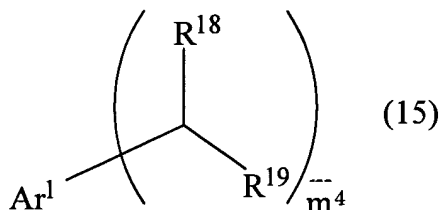
**13. (New)** A method of manufacturing an unsaturated compound or an aromatic compound which comprises reacting an aromatic compound of formula (3),



wherein  $\text{Ar}^1$  is an aryl group which may be substituted or a heteroaryl group which may be substituted;  $\text{X}^1$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group, and  $m^1$  is an integer of from 1 to 4, with a carbonyl compound or a cyano compound of formula (14),



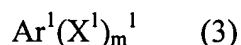
wherein  $\text{R}^{18}$  is a hydrogen atom,  $\text{CO}_2\text{R}^{20}$ ,  $\text{C(=O)R}^{21}$  or a cyano group;  $\text{R}^{19}$  is  $\text{CO}_2\text{R}^{22}$ ,  $\text{C(=O)R}^{23}$  or a cyano group;  $\text{R}^{20}$ ,  $\text{R}^{21}$ ,  $\text{R}^{22}$  and  $\text{R}^{23}$  are each an alkyl group, an aryl group which may be substituted or a heteroaryl group which may be substituted, to give a compound of formula (15),



wherein  $\text{Ar}^1$ ,  $\text{R}^{18}$  and  $\text{R}^{19}$  are as defined above and  $m^4$  is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the phosphine compound of claim 1 and a palladium compound as catalysts.

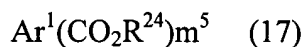
14. (New) A method of manufacturing an unsaturated compound or an aromatic compound which comprises reacting an aromatic compound of formula (3),



wherein  $\text{Ar}^1$  is an aryl group which may be substituted or a heteroaryl group which may be substituted;  $\text{X}^1$  is a chlorine atom, a bromine atom, an iodine atom, a trifluoromethanesulfonyloxy group, a methanesulfonyloxy group or a para-toluenesulfonyloxy group; and  $m^1$  is an integer of from 1 to 4, with carbon monoxide and an alcohol of formula (16),



wherein  $\text{R}^{24}$  is an alkyl group,  
to give a carboxylic ester of formula (17),



wherein  $\text{Ar}^1$  and  $\text{R}^{24}$  are as defined above and  $m^5$  is an integer of 1 to 4, and

wherein the reaction is conducted in the presence of the phosphine compound of claim 1 and a palladium compound as catalysts.